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DESCRIPTION OF A RACE OF *DIPODOMYS*
MERRIAMI FROM ARIZONA.

BY SETH B. BENSON,

Museum of Vertebrate Zoology, University of California, Berkeley, California.

Among the mammals collected by Miss Annie M. Alexander and Miss Louise Kellogg in Arizona in the fall of 1932 was a series of extraordinarily dark-colored Merriam kangaroo rats. This series was obtained in the vicinity of Vulcan's Throne which is a cinder cone standing on the north rim of the gorge of the Colorado River in the lower end of Toroweap Valley. Field parties led by Miss Alexander during 1933 and 1934 have collected more specimens from this locality and, in addition, have obtained specimens of Merriam kangaroo rats from many other localities in Arizona, including forty-eight topotypes of *Dipodomys merriami merriami* Mearns. These specimens, together with those already present in the Museum of Vertebrate Zoology, are the basis for the description which follows and for the accompanying comments upon the geographical variation in this species in Arizona. The race from Toroweap Valley may be known as:

***Dipodomys merriami vulcani*, new subspecies.**

Type.—Adult male, skin and skull, no. 56002, Mus. Vert. Zool.; from the lower end of Toroweap Valley (about $\frac{1}{2}$ mile east of Vulcan's Throne), Mohave County, Arizona; collected November 11, 1932, by Annie M. Alexander; original number 2064.

Distribution.—Known only from type locality.

Diagnostic characters and comparisons.—A race of *Dipodomys merriami* characterized by dark, dull dorsal color. Similar to *Dipodomys merriami merriami* Mearns (represented by forty-eight topotypes) in size (see measurements) and skull characters, but distinctly darker in general dorsal coloration; dusky markings on nose and at base of vibrissae darker and more extensive; soles of hind feet more extensively blackish; dorsal and ventral tail stripes

darker and wider; dusky hairs on leg above heel much darker; hairs on outer side of foreleg near elbow colored like hairs on back rather than white.

Color.—(capitalized color terms after Ridgway, Color Standards and Color Nomenclature, 1912). Basal portion of dorsal hairs Slate Gray in *vulcani*, Gray (Deep Gull Gray) in *merriami*; subterminal band close to Pinkish Buff in both races, but narrower in *vulcani*; terminal portion of hair heavily tipped with dusky in *vulcani*, only lightly in *merriami*. In *vulcani* the color of the basal portions and tips of the hairs dominates the general color tone of the dorsal surface; in *merriami* the color of the subterminal band dominates.

Specimens examined.—Twenty-four from the type locality.

Remarks.—The dark color of *vulcani* is probably correlated with the color of the volcanic cinders which cover the ground in the vicinity of Vulcan's Throne.

A study of the topotypes of *D. m. merriami* and of numerous specimens of this species from more than 175 localities in the Southwest from Texas to California present in the Museum of Vertebrate Zoology prompts the following remarks concerning the geographic variation in this species in the United States. As now generally understood, the race *merriami* inhabits the Southwest from western Texas west to the western edge of the Mohave Desert and north in the Great Basin at least as far as Pyramid Lake, Nevada. The race *D. m. simiolus* Rhoads occupies the Colorado Desert of California and the extreme southwestern part of Arizona. On the Pacific slope drainage of California are several other segregates of the *merriami* group which do not concern us here.

Several names have been proposed for geographic variants within the area now ascribed to the race *merriami*, but Grinnell (Univ. Calif. Publ. Zool., 24, 1922, 73-77) synonymized these names with *merriami*. More recently Swarth (Proc. Calif. Acad. Sci., 18, 1929, 356-359) proposed the name *olvaceus* for a race from Fairbank, Arizona.

In Arizona the darkest Merriam kangaroo rats are from Toroweap Valley, the palest are from Yuma and south of Yuma along the valley of the Colorado River. Between these extremes, and from areas more or less intermediate geographically, all degrees of intergradation are present. South of the Colorado River, Merriam kangaroo rats inhabit the area south and west of the Mogollon Plateau. Those from nearest the plateau and in the northwest, from Sacramento Valley, New River, Arlington, Solomonsville, Dos Cabezos, Fairbank, San Bernardino Ranch, are relatively dark in color. Specimens from the area between these localities and Yuma grade toward *simiolus*. Specimens from California and Nevada exhibit various degrees of approach toward *simiolus* on the one hand and topotypes of *merriami* on the other. Specimens from St. George, Utah, closely approach topotypes of *merriami* in dark color. Among specimens from the edge of the Virgin Valley, 6 and 10 miles north of Wolf Hole, Arizona, are examples as dark as *vulcani*, indicating intergradation with that race.

Although topotypes of *merriami* are perceptibly darker than the majority of specimens ordinarily ascribed to that race, it is not deemed advisable to

restrict the name *merriami* to the darker kangaroo rats of central Arizona. It would be difficult at present to define satisfactorily the race or races included in the population of kangaroo rats intermediate in character between *merriami*, represented by topotypes, and *simiolus*, because the amount of geographic variation in color, size, and skull characters is small, and largely obscured by a great amount of individual variation in these characters.

In his description of *D. m. olivaceus* Swarth (*loc. cit.*) drew comparisons between the specimens from Fairbank and specimens from the vicinity of Tucson, assuming the latter to be typical of *merriami*. He stated that *olivaceus* was not a strongly marked form. Although specimens from Fairbank and from near Tucson undoubtedly do differ in the manner described by Swarth, there are no distinctive differences between specimens from Fairbank and from New River either in color, size, or skull characters. Consequently, it is best to regard *olivaceus* as a synonym of *merriami*.

It appears best for the present to retain the usage of the name *merriami* as applied by Grinnell (*loc. cit.*) while recognizing that the kangaroo rats included under that name vary from specimens nearly as dark as *vulcani* to specimens nearly as pale as *simiolus*.

MEASUREMENTS, IN MILLIMETERS AND GRAMS, OF TOPOYPES OF *Dipodomys merriami merriami* AND *Dipodomys merriami vulcani*.
 [Measurements of skull according to method described by Grinnell (Univ. Calif. Publ. Zool., 24, 1922, 4-7).]

	Total length	Tail length	Hind foot	Bar from notch	Bar from crown	Head and body	Weight	Greatest length of skull	Breadth of skull across bullae	Spread of maxillary arches	Greatest length of nasals	Greatest width of rostrum near end	Width of maxillary arch at middle
							<i>merriami</i> (adult males).						
Number of specimens	27	27	27	16	11	27	27	27	27	27	27	27	27
Mean	247	146	37	11	15	101	40.9	35.9	22.9	19.6	13.3	3.1	5.1
Minimum	234	132	35	10	14	94	34.3	34.8	22.0	18.5	12.7	2.8	4.4
Maximum	262	164	39	11	16	108	45.9	37.4	23.9	20.6	13.9	3.4	5.5
							<i>merriami</i> (adult females).						
Number of specimens	21	21	21	14	7	21	21	21	21	20	21	21	21
Mean	242	142	37	11	15	100	37.7	35.4	22.9	19.7	13.2	3.1	5.1
Minimum	232	132	34	10	14	95	34.2	34.2	21.9	18.4	12.6	2.9	4.7
Maximum	256	153	38	11	15	105	41.5	36.6	24.1	20.4	14.1	3.4	5.5
							<i>vulcani</i> (adult males).						
Number of specimens	10	10	10	10	—	10	10	9	9	9	10	10	9
Mean	242	143	38	10	—	99	38.3	35.4	22.8	19.7	13.4	3.2	5.1
Minimum	228	135	37	9	—	92	29.8	34.0	21.8	18.2	13.1	3.1	4.6
Maximum	252	152	39	11	—	105	44.4	36.7	23.4	20.1	14.2	3.5	5.7
							<i>vulcani</i> (adult females).						
Number of specimens	14	14	14	14	—	14	14	14	14	10	13	14	14
Mean	235	137	38	10	—	98	37.1	35.2	22.2	19.1	13.1	3.2	5.1
Minimum	227	130	36	9	—	92	31.4	34.1	22.0	18.0	12.4	3.0	4.7
Maximum	244	145	40	11	—	105	51.5	36.6	23.6	20.1	13.8	3.6	5.6